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Christmas

AT a time when this country, and much of the world, is in a state of tension and ferment, it is of more than usual relief to expel, however temporarily, these burdens from the mind and welcome the benignity of Christmas. To those who profess the Christian faith the season has its own message and bears a significance far deeper than that of the traditional relaxation and enjoyment. But even those of other faiths, or of none, may welcome the sense of respite from all those cares and preoccupations which are the common lot, and find rewarding that one day when goodwill, kindliness, and benevolence fill the air and pervade so much of the human scene.

For members of our profession it is an enheartening thought that the animals—our particular care—held so prominent a place in the first Christmas, and have become so closely integrated with Christian teaching. Nor, indeed, with that teaching alone, for each of the world religions enjoins upon its followers the proper treatment of all the sentient creation; and though we may admit some poetic licence in Shakespeare's suggestion that " the poor beetle that we tread upon in corporal sufferance feels as much as when a giant dies," the fact remains that care for the lives and feelings of animals has been woven into the moral code of practically every civilised nation.

We may take another pleasure in the thought of Christmas, inasmuch as, among all the sciences there can be none more wholly devoted to the arts of peace than is ours. Man learned the science of agriculture before the science of war, and it has been repeated, with truth, that our primary task, that of helping to supply the world with sufficient, nourishing food, is a major contribution to removing the causes of strife. In this connexion we send a special greeting to British veterinary surgeons working in the Colonial Empire, and to our Indian and other Asiatic colleagues—not a few of them readers of this journal—who are battling with problems the magnitude of which we can scarcely grasp, but whose ultimate solution will help to deliver millions from want.

We send greetings, too, to our distant colleagues in Australia, some idea of whose work and special problems was given in a recently published article. This Christmas they, together with those in Africa, New Zealand, the Caribbean, and elsewhere, will be much in our thoughts.

The present is, traditionally, the season of personal generosity, and it may be hoped that the appeal for the Victoria Veterinary Benevolent Fund, published at the beginning of this month, will not go unregarded. Few of us can be certain of immunity from ill health, misfortune, or the disabilities of old-age, and help is needed for those in difficulty now. That such difficulties are both pressing and real is exemplified in the report of the Fund's Council meeting which appears on another page. There will be many appeals made this Christmas, most of them for excellent causes; but for members of the veterinary profession, none should take priority over that for their own colleagues, or for their dependants, who have fallen upon bad times.

As the year draws to a close THE VETERINARY RECORD can look back upon 12 months when, in spite of difficulties in the printing trade, a record number of contributions will have been published, and the journal's prosperity maintained.

Our grateful thanks are due to all those contributors, scrutineers, abstractors, and others who have helped to bring this state of affairs about, and to our advertisers, whose continued support is of so much value.

A very happy Christmas to all our readers, and to members of the profession everywhere; may prosperity and peace be theirs, and the New Year bring the fulfilment of many hopes.

Acid Firing: Counter-irritation by Acid for the Treatment of Sprained Tendon in the Horse

BY
BRIGADIER E. S. W. PEATT
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Introduction

FOLLOWING the publication in THE VETERINARY RECORD of December 10th, 1955, of a paper read by me to the Midland Counties Veterinary Association, I have received numerous enquiries from veterinary surgeons in this country and abroad regarding this method of firing.

Consequently, I thought it would be of interest to publish a follow-up report on some of the horses treated in this way with comments on various matters connected with the operation and a description of an improved technique evolved after further experience.

Four years have elapsed since the first horse was acid fired, and in order to assess the results more accurately a questionnaire was sent to the owners of the first 16 cases treated; they are not specially selected, but are taken in sequence from the case book.

The accompanying Table sets out the answers to the questions asked together with a description of the injury to the tendon in the various horses.

Observations

General

It can be seen from the Table that, of the 16 cases recorded, 12 remained sound in the fired leg after various types of work.

Of the remaining four:—

No. 7 was sold as a hunter when trotting sound, has left the district and no information as to his progress is available.

No. 11 was a severe sprain, and the prognosis was that the horse might stand hunting but not racing.

No. 12 went lame in the foot before he could be tried out and can be ignored.

No. 13 was an unsatisfactory horse to fire on account of bad conformation.

Advisability of Firing the Sound Leg

In three instances the horse sprained the tendon in the opposite foreleg, *i.e.* Nos. 8, 10, and 14, and this raises the question of the desirability of firing the sound leg as well as the affected one.

Where I have been satisfied that the tendon in the opposite leg is perfectly sound, I have not fired it for the following reasons:—

(a) It is difficult to understand why firing a sound leg can strengthen the tendon.

(b) There is no object in firing the sound leg to prevent the animal taking undue weight on it during the period of treatment, as may be advisable in hot-iron firing, because there is no pain suffered by the patient after acid firing which would cause him to rest the affected leg at the expense of the other.

(c) Once a leg has been fired it is not advisable to do it again because of the impossibility of avoiding the spots already fired; these are composed to a variable extent of scar tissue which is prone to break down when acid is applied and the resulting wounds may take a long time to heal.

A possible explanation of the animal breaking down in the sound leg is that a certain degree of contraction takes place during repair of the sprain in the affected leg, and in consequence the horse is inclined to save it at the expense of the other.

Period of Rest Before and After Firing

It has been my practice to confine cases of sprained tendon in a straw yard or small enclosure where there is insufficient room to gallop. Such confinement continues during the period before firing, whilst the inflammation is subsiding, and after the operation until I am satisfied that the repair is such as will enable the leg to stand up to the stress of galloping about a field at grass.

The periods vary considerably depending on the severity of the sprain, but as a rule it takes six weeks to two months to reduce the initial inflammation so that the tendon is cool and fit to fire; the time which elapses before the horse is turned out depends on several things, such as the temperament of the animal, the condition of the tendon, and whether he has been out at grass before firing took place. If the horse is likely to gallop about a lot it is best to be on the safe side and keep him in for a further period of four to six weeks. In some cases the owner has turned the horse out to grass after the tendon has become cool and before firing, and this has much to recommend it, because the animal can be put to grass again within 24 hours after firing and is unlikely to gallop about as he has already settled down. On the other hand, if kept shut up in a straw yard for a long period and then fired and turned out he is sure to gallop, and should he resprain the tendon it is not advisable to treat it again as already explained.

Shoeing

Horses with sprained tendons should always be kept shod in front as it gives better support and prevents the toes getting long and thereby throwing unnecessary stress on the leg.

Adhesions

The formation of adhesions between tendon and sheath is a complication in sprain of the flexor tendon which, in my view, often accounts for an unfavourable outcome.

It is, therefore, undesirable to immobilise the horse for long periods in a stall or small loose-box as this

TABLE OF RESULTS OBTAINED BY "ACID FIRING" 16 CASES OF SPRAIN OF THE FLEXOR TENDONS IN THE HORSE
(Compiled from answers to a questionnaire sent to the owners)

Case No.	Breed colour and sex	Age	Date fired	Description of injury	Period rested	Result	Work done	Races in which horse ran	Owner's remarks
1	TB. bay geld.	6	May, 1952	Sp. sup. flex. tnd. N.F., with slight bowing	5 months at grass	Still sound	Hunted regularly, ran in pt. to pts and 'chases	Ran in 12 races, winning one 'chase and two pt. to pts. Placed several times	To my mind a 100% job.
2	TB. brown geld.	5	June, 1952	Very severe sp. of both flex. tnds. N.F. and susp. lig. above fet. joint	5 months at grass	Still sound	Started hunting in autumn and regularly hunted since. Ran in pt. to pt.	Ran in one pt. to pt. in 1956	Am extremely pleased with this firing; it was considered a hopeless case for racing again but after four years' hunting he proved capable of running and had it not been for the hard going would have run in several races.
3	TB. bay geld.	7	Aug., 1952	Very severe sp. of sup. and deep flex. tnds, and check lig. B.F. with great enlargement and bowing at middle of tnds.	12 months	Still sound	Hunting and chasing	Has run in 20 'chases since being fired. Won six, five this season in sequence and placed three times	He feels nothing of his legs but gets periods of sore shins early in the season.
4	TB. bay geld.	7	March, 1953	Sp. of sup. flex. tnds. B.F. at middle of metacarpus with sl. bowing	6 months	Legs kept sound. See owner's remarks	Hunted two seasons and ran in pt. to pts.	Ran in 10 pt. to pts. — won two placed twice	Injured the pedal bone O.F. in 1953–54 hunting season and was lame for three months. Sprained fet. in last race in 1955 and when at grass recovering cut through tendon below fet. and was destroyed.
5	HB. grey geld.	10	June, 1953	Sp. of sup. and deep flex. and both branches susp. lig. above fet. N.F. Flexion in joint 30% normal	5 months	Kept sound	Hunted hard for three seasons in Midlands	None	Retired after 1955–56 hunting season, heart trouble; legs still sound as a bell. Consider acid firing 100% improvement on hot iron; horse suffered nothing at all during or after the firing.
6	TB. bay mare	5	July, 1953	Sp. of sup. flex. tnd. N.F. with slight bowing middle of leg	5 months	Still sound	'Chasing and hurdle racing	Ran in 16 races, won two hurdle races, placed second once. Placed twice in 'chases	I find that acid firing is very successful; the mare remained sound throughout her racing career.
7	¾-bred brown geld.	8	July, 1953	Very severe sp. of sup. and deep flex. tnds. and check ligs. B.F. with considerable bowing	6 months	Got sound	Not known	None	When he got sound I sold him as a hunter and have no knowledge about him since.
8	TB. chest. geld.	5	July, 1953	Sp. of sup. flex. tnd. N.F. with some bowing at centre of leg	7 months	Still sound	Started hunting in Jan., 1954, but sprained the O.F. flex. tnd. See No. 9, same horse	None	
9	TB. chest. geld.	6	Feb. 1954	Sp. of sup. flex. tnd. O.F. above fet. little bowing	5 months	Still sound	Regularly hunted seasons 1954–55 and 1955–56. Ran in pt. to pts.	Ran in six pt. to pts., won one and placed twice in 1955. Placed three times in 1956	Has remained sound in both legs but does not like hard going. In my opinion the rest is necessary.
10	TB. brown mare	8	May, 1954	Severe sp. of sup. and deep flex. tnds. and check lig. below knee N.F.	5 months	Still sound in fired leg	Started hunting in autumn 1954 but O.F. leg filled and was blistered. Sound autumn 1955 but during hunting O.F. leg gave trouble and during final gallop in preparation for hunter chase broke down	None	Repairs to N.F. leg very satisfactory but consider that O.F. should have been fired at the same time.
11	TB. brown geld.	9	June, 1954	Severe sp. sup. and deep flex. tnds. and check lig. N.F. with considerable enlargement from knee to fet.	5 months	Broke down in gallop, Feb., 1955	Hunting 1954 – 55 season and training gallops	None	This horse broke down in race in spring 1954 and condition made much worse as rider could not pull up jumping three fences after injury had occurred. After firing leg became hard and horse sound and stood up to hunting but broke down in final gallop before pt. to pt.
12	TB. grey geld.	6	Sept., 1954	Sp. of sup. flex. tnds B.F. with slight bowing at centre of tnd.	5 months	Not tried out	See owner's remarks	None (a three-day event horse)	Went lame in the foot after light work in April 1955 and turned out to grass. Tendons appear hard and sound. In view of this I doubt if this case can help in assessing the value of acid firing.
13	TB. brown geld.	5	Feb., 1955	Slight sp. of sup. flex. tnds. B.F., no bowing	6 months	Broke down	Hunting and gallops in training for racing	One race and was winning when broke down	This horse was very back at the knees and stood very straight on his pasterns and was a big-topped horse. Was fired as a precaution as I, the trainer, did not think that his legs would stand racing.
14	T.B. bay geld.	6	May, 1955	Sp. of both flex. tnds. N.F. with some bowing above fet.	5 months	Still sound in N.F.	Regularly hunted and ran in one pt. to pt.	Ran in one pt. to pt. when he broke down in the other leg	Was regularly hunted during the season 1955–56 and stood up to training gallops for pt. to pts. but sprained the O.F. flex. tnd. in the only race in which he ran and was acid fired in this leg on 25.3.56.
15	TB. brown geld.	8	June, 1955	Sp. of both flex. tnds. O.F. with bowing above fet.	5 months	Still sound	Hunted hard (whipping - in) from Dec. 18 days. Ran in pt. to pts.	Ran in three pt. to pts. in 1956. Won one and placed once	Has remained perfectly sound in fired leg in spite of hard hunting and running in three races on hard going. I am more than pleased with the leg but wish that the other had been fired.
16	TB. bay geld.	5	June, 1955	Sp. sup. flex. tnd. and susp. lig. N.F.	4 months	Still sound	Hurdle racing	Ran in four hurdle races, fourth once	He has kept perfectly sound.

ABBREVIATIONS: TB. = Thoroughbred. HB. = Halfbred. N.F. = Near fore. O.F. = Off fore. B.F. = Both fore. Fet. = Fetlock. Sp. = Sprain. Sup. = Superficial. Flex. = Flexor. Tnd. = Tendon. Sl. = Slight. Lig. = Ligament. Susp. = Suspensory.

NOTES: The extent of the damage to the tendon is indicated as follows:—
Slight sprain = A tendinitis accompanied by filling of the leg but no bowing of the tendon; a few tendon fibres may be ruptured but as a rule it is the tendon sheath that is injured.
Sprain = Some tendon fibres have been ruptured and bowing of the leg usually occurs.
Severe Sprain = A considerable number of fibres have been ruptured and the leg is much enlarged.
Very severe sprain = The damage to the tendon almost amounts to a complete rupture.

favours their onset, and for this reason I advise a straw yard and walking exercise in hand at the first possible moment when the leg is being treated for removal of the inflammation subsequent to the sprain.

Horses fired with the hot iron, or blistered, may develop adhesions due to the leg being rested because of the pain suffered; this does not occur after acid firing as it is painless, and in this particular alone it has a great advantage over other methods of inducing counter-irritation.

Improved Technique

Sleek

As described in my previous article, this is a type of very thin adhesive plaster* with an outer glossy surface which will resist the action of sulphuric acid concentrate for 30 minutes. It can be obtained in various widths, but the size recommended is a roll 4 inches in width.

The dimensions of the holes in the sleek for general use are $\frac{3}{8}$ inch in diameter, spaced $\frac{3}{4}$ inch apart from centre to centre.

For fine tendons $\frac{1}{16}$-inch holes, $\frac{5}{8}$ inch apart, are more satisfactory than the $\frac{1}{4}$ inch recommended previously.

Application of Acid

It is a laborious procedure to apply the acid with a cork, as this entails dipping the cork in the acid for each individual spot fired. By substituting a piece of felt, cut in the form of a cylinder and plugged into a metal tube as a holder, with about a $\frac{1}{4}$ inch protruding, it is possible to fire five or six spots with one dip in the acid.

A pencil-type electric torch cylinder, with a piece of wood in the bottom, of such a length as to prevent the felt being pushed into the tube, makes a suitable holder; the diameter of the felt should be greater than that of the holes in the sleek, so that when the acid is applied to the skin the felt presses the plaster surrounding each hole tightly against the skin, thereby preventing the acid getting between skin and sleek.

A very suitable type of felt is that supplied by garages in the form of a felt oil seal for wheel hubs.

A fresh piece of felt is required for each horse fired, and as more acid is liable to run down over the sleek than was the case with a cork, the operator must hold a piece of cotton wool in one hand with which to wipe it off.

Since employing this method I apply the acid very lightly and quickly to all the spots first and then, more deliberately and using more pressure, go over them all twice again. The advantage of this procedure is that the first light application is sufficient to deaden sensation in the nerves in the skin whilst not causing the horse any discomfort.

With felt one can fire much more quickly and there is no chance of acid trickling down between the leg and the plaster as sometimes occurred with a cork; a good light is essential and the inner side of the leg should be fired first.

* Made by Messrs Smith & Nephew Ltd., Bessemer Road, Welwyn Garden City, Herts.

Additional Firing Marks

In some sprains where the tendon is more enlarged at one point than another it may be necessary to add an additional row of firing marks on each side; in such cases a strip of sleek, with a single row of holes in it, is cut off and stuck on each side of the leg.

Use of Antacid Ointment

Four days after firing, the following ointment is smeared all over the fired tendon:—

℞

Sod. Bic. ... ... ʒss.
Ung. Calam. Co. ad. ʒii.

This ointment can also be used during the operation to neutralise acid which inadvertently gets on parts of the leg, etc., where it is not required.

Propamidine ointment is useful for horses at grass, as it prevents infection of the small wounds resulting from the firing and tends to keep off flies.

Restraint

I have fired some horses with no form of restraint other than having the opposite foreleg held up, but it is advisable to apply a twitch from the start of operations because once the sleek has been stuck on the leg it is necessary to prevent the horse flexing the affected leg as this is liable to cause the plaster to ruck up slightly.

A stinging sensation is apparently felt on the first application of the acid, but with the second application the horse usually shows no reaction; this is due to the fact that the acid has the effect of deadening sensation in the superficial nerves.

Inadvertently, I have experienced the stinging sensation myself which quickly wears off. If the acid is not removed a burn will result without the knowledge of the victim; the sensation is like that felt when stung by a nettle.

AN AMERICAN VETERINARY HEADQUARTERS

In view of the comparatively recent organisation by the B.V.A. of its own permanent headquarters, and the decision of the Royal College to rebuild, if possible, a handsome new premises on its present site, it is interesting to learn that the minds of our American colleagues are moving in the same way. A recent resolution of the A.V.M.A. reads:—

The ownership of our building for the national headquarters of the Association, and the decision as to its location, should be the subject of careful study and investigation, possibly by a special committee which would render a report and recommendations at an annual meeting in the near future. At present, and for some years past, we have spent considerable amounts for office rent, and we have nothing of a permanent nature as a result of this spending. Our own building, of proper size and in a good location, should provide the necessary office space for our national headquarters now and in an expanded future.

The A.V.M.A. is here to stay and it is time that we consider the matter of a permanent home.

New Records of Nematodes in British Cattle

BY

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WHILST our knowledge of the helminths of British sheep is extensive, this is not the case with the helminths of British cattle. Despite the existence of comprehensive lists of cattle parasites little has been done to verify the occurrence of many species in this country. A possible explanation for this may be that the great bulk of the contents of the abomasum and small intestine of cattle necessitates prolonged and tedious examination whilst a similar examination of sheep material is less exacting.

This communication records the occurrence of three species of bovine nematode which hitherto do not appear to have been observed in British cattle. These were present in material collected by one of us (E. J. L. S.) from cattle suffering from fatal parasitic gastro-enteritis in the South-west of England. These cases occurred on different farms, thus indicating that the parasites are generally distributed, at least in the above area.

Unfortunately only the contents of the small intestine were available for study and a cursory examination suggested that the worm burden consisted of large numbers of *Cooperia oncophora* as is usually found in such cases of acute parasitic gastro-enteritis. A more detailed examination revealed that, in addition to *C. oncophora*, other species of the genus *Cooperia*, namely, *C. macmasteri*, *C. punctata* and *C. curticei* were present. *C. macmasteri* has been recorded by Baylis (1938) as occurring in a lamb in North Wales, but this appears to be the first record in British cattle. *C. macmasteri* was fairly numerous in the material and might well, along with *C. oncophora*, be of importance in the causation of enteritis. The differentiation of *C. oncophora* and *C. macmasteri* presents some difficulty without detailed examination, and consequently the latter may easily be overlooked. *C. punctata* is included by Oldham (1938) in his list of species in domestic animals but is marked among the species which "are known either not to occur or to occur only very rarely in the British Isles." *C. punctata* may be overlooked on cursory examination since it resembles members of the genus *Trichostrongylus*. *C. curticei* is a common parasite of British sheep and has been previously recorded in cattle in Britain. Both *C. punctata* and *C. curticei* were present in small numbers only.

The genus *Nematodirus* was represented in the material by *N. filicollis*, a common parasite of sheep and *N. helvetianus* which is a new record for this country. Here also differentiation of species is not easy and depends mainly on the size of the bursa and the length of the spicules.

The genus *Trichostrongylus* was represented by one species only, namely *T. colubriformis*. This species may be easily mistaken for *T. longispicularis* but the latter was not found in our material.

A few specimens of *Capillaria bovis* were present; this parasite has previously been recorded from cattle by Morgan (1925).

It is unfortunate that the contents of the abomasum were not available for study but the presence of *Ostertagia ostertagi* and *T. axei* in the contents of the small intestine suggested that they were present in substantial numbers in the abomasum of these cattle.

A tentative list of nematodes in the alimentary canal of British cattle, based on the present findings and on previous records would include the following:—

ABOMASUM

Haemonchus contortus
Ostertagia ostertagi
Ostertagia circumcinta
Trichostrongylus axei

SMALL INTESTINE

Trichostrongylus colubriformis
Trichostrongylus vitrinus
Cooperia oncophora
**Cooperia macmasteri*
Cooperia curticei
**Cooperia punctata*
Nematodirus filicollis
**Nematodirus helvetianus*
Bunostomum phlebotomum
Bunostomum trigonocephalum
Capillaria bovis
Ascaris lumbricoides

LARGE INTESTINE

Oesophagostomum radiatum
Chabertia ovina
Trichuris ovis

Previous records to some of the above species in Britain are included in the following list of references.

see addition - v. 69 - p. 42.

* These are newly recorded in cattle in Britain.

References

BAYLIS, H. A. (1938). *Vet. Rec.* **50.** 283.
CAMERON, T. W. M. (1922). *Vet. J.* **78.** 185.
———. (1923). *J. Helm.* **1** (2). 53.
CAVE, T. W. (1907). *J. S.-E. Agric. Coll.* No. 16. 369.
GARDENER, R. C. BRUCE. (1912). *Ibid.* No. 20. 482.
M'FADYEAN, J. (1896). *J. Comp. Path.* **9** (4). 314.
MORGAN, D. O. (1924). *J. Helm.* **2** (2). 89.
———. (1925). *Ibid.* **3** (3–4). 167.
N.V.M.A. Publ. No. 8. (1949). Report on Diseases of Farm Livestock. Section III. Parasitic Diseases of Cattle.
OLDHAM, J. N. (1938). *Vet. Rec.* **50.** 1,131.
PILLERS, A. W. N. (1931). *Ibid.* **11.** 462.

MASCOT IN RETIREMENT

A correspondent has sent in the following from the journal of the Royal Welch Fusiliers:—

Subsequent to an accident in Malaya, in which he fractured his near hind leg, Billy, the Second Battalion goat, was returned home for treatment. After a period in quarantine at the Depot he was sent to Liverpool where he was operated on at the University Veterinary Hospital and the damaged bone was successfully reknit and straightened. Unfortunately, during the many months which necessarily ensued between the accident and the operation, the leg muscles wasted through lack of use, and since he has learned to move well enough on three legs for his own purposes, it has been found impossible to get the muscles in condition again through exercise or massage. He is now living in comfortable retirement and roaming the barrack fields at the Depot. He is a little tired of publicity—a fact about which press photographers are now well aware.

Observations on Restricted Ventilation in Pig Houses

BY

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MUCH has been written in recent years concerning the various climatic factors associated with the well-being of the housed pig, and, among the various factors studied, ventilation has received considerable attention. The conventional view is that fresh air is required in an animal habitation to ensure an adequate oxygen supply and remove carbon dioxide, ammonia, and moisture. There was a tendency too, in years gone by, to consider that the greater the supply of fresh air the better for the housed animal, though it is now generally agreed that as far as the pig is concerned, caution is needed in this direction. The importance of a suitable environmental temperature and the absence of draughts have been stressed by various workers.

Ventilation rates are usually expressed on the basis of an air exchange rate per pig per hour and there is considerable variation in the figures reported as being desirable in pig houses. Sainsbury & Dunkin (1953) found that an average ventilation rate of 300 cubic feet per pig per hour in a McGuckian-type house and 700 cubic feet per pig per hour in a Danish house enabled "atmospheric conditions to be kept satisfactory." In bulletin No. 160, "The Housing of Pigs," an exchange rate of 800 cubic feet per pig per hour is considered reasonable, and this bulletin also warns against allowing a foul, oppressive atmosphere to develop, particularly as it seems "probable that ammonia weakens the respiratory organs of pigs and so renders them more susceptible to disease in the associated organs."

Many of the estimates of air change are based on measurements of the carbon dioxide content of the air and, accepting a permissible standard of impurity, calculating the amount of air change necessary to maintain this standard. This method can be criticised on the grounds that, while the amount of carbon dioxide produced by the resting animal has been calculated, that produced by the excited or active animal is increased by an unknown and variable amount. Inglis & Robertson (1949) rightly criticised the carbon dioxide method of estimating the suitability of air flow and they point out that there is no validity for the assumption that if the carbon dioxide content is maintained at a satisfactory level, other important factors are likely to be adequate. The Report of the Heating and Ventilation (Reconstruction) Committee of the Building Research Board (1945) also point out that the concentration of carbon dioxide is not sufficiently critical to provide a basis for fixing rates of ventilation for human dwellings.

We have not solved the problem of devising satisfactory objective tests for determining the suitability or otherwise of the ventilation in a pig-house, but we have had an opportunity of observing the behaviour of pigs maintained under conditions of restricted ventilation, and the purpose of this note is to draw attention to the behaviour of fattening pigs kept in conditions which appear to contravene accepted principles of pig husbandry. In one case the pigs were housed in a McGuckian type of fattening house in which the front of the veranda had been walled up, the pigs being denied access to the outside yard, the veranda area thus serving as a dunging space. This modification, together with a reduced ventilation outlet, had led to a reduction in ground draughts, air movement, and diurnal temperature variations, with an increase in absolute and relative humidities. The subjective impression on enterering this house is extremely unfavourable, the heat feels oppressive and the atmosphere very stuffy; yet the effect on the pigs, as judged by the reduced sickness rates and accelerated output of bacon, has been most favourable. In view of this the tolerance of the pigs to further restriction in ventilation was examined and the ventilation outlet was reduced still more. This had the effect of producing what can only be described as a turkish bath type of atmosphere. Rather surprisingly the pigs showed no signs of stress and sickness rates were reduced by over 25 per cent. In these conditions the pigs did tend to micturate and defecate indiscriminately in the house, especially in periods of very hot weather. To date, large numbers of pigs have been observed under these conditions and so far no harmful effects have been detected. Even during the very warm summer of 1955, when inside temperatures reached 85° F. the pigs continued to thrive. In spite of the atmospheric conditions, with the floor often wet with urine and fouled with faeces and usually condensation running from roof and walls, sickness of any kind is practically non-existent.

The effects of the restriction of ventilation have also been observed in another large commercial piggery. The houses used on this farm were large, airy, concrete structures based on the Danish pattern. The premises had a very bad disease history; pneumonia was an ever-present problem and scours of different kinds were common. The house was modified by extending the pen partition walls up to a height of 6½ feet and roofing over with a false ceiling of flat asbestos sheets. The doorway leading to the central feeding passage was made as near airtight as possible. The only ventilation was *via* the windows which consisted of panes of glass set in grooves and capable of sliding past one another. During winter, 4 to 5 square inches of ventilation space was provided per pig and this space functioned as inlet and/or outlet. The floor was uninsulated and no bedding was used. Pigs of about 110 lb. bodyweight had, per head, approximately 6⅝ square feet of total floor

space and 44 cubic feet of air space. Here again the turkish bath type of atmosphere prevailed, with dripping ceiling and walls, but sickness rates were only a fraction of what they had been before the alterations were carried out.

The two establishments referred to are producing many thousands of bacon carcases per annum and it is emphasised that the conditions described have now been in existence for over two years. So far the results have exceeded all expectations in the economical output of bacon. The excessive moisture and condensation must in the long run have a detrimental effect on the structure of the houses, but this the owners are prepared to accept in view of the unprecedented low casualty rate among their pigs.

Our present observations suggest the need for the critical examination of the ventilation requirements of the fattening pig. In 1949, Inglis and Robertson pointed out that " much of the published material on air supply determinations for animal habitations is at best only pseudo-scientific, though the large figures for air flow arrived at have sometimes been defended on the grounds that one must supply large amounts of fresh air to dilute airborne infections. Such statements are usually made without much consideration of the modes of airborne infection or their application to pig disease problems."

On both the premises discussed above, respiratory conditions formed an important part of the casualty rate: yet from the conventional viewpoint the conditions created should have favoured the spread of such infections. In practice the reverse has been the case. The relationship and reactions of the pig to its environment are admittedly extremely complex and too many of the accepted notions of the pigs' needs are based on subjective observations and have not the backing of critical experimentation.

In view of the fact that much of what is discussed above is at variance with accepted ideas of hygiene and ventilation it is perhaps wise at this stage to suggest that anyone contemplating the adoption of restricted ventilation in pig houses should proceed cautiously and test out in a small way how this system works in the particular circumstances. Especial care is needed where buildings are wired for electricity. Thorough insulation and waterproofing of all wires is essential if serious short-circuiting is to be avoided.

Summary

On two large commercial pig farms the effects of restricted ventilation on fattening pigs were studied. The consequent high relative and absolute humidities had no apparent harmful effects and over a period of two years sickness rates were very much reduced.

References

" Housing of Pigs." (1953). Bulletin No. 160, Ministry of Agriculture and Fisheries. H.M. Stationery Office.

INGLIS, J. S. S., & ROBERTSON, A. (1949). *Vet. Rec.* **61.** 141.

Report of the Heating and Ventilation (Reconstruction) Committee of the Building Research Board. (1945). Post-war Building Studies No. 19. H.M. Stationery Office.

SAINSBURY, D. W. B., & DUNKIN, A. C. (1953). *Brit. Vet. J.* **109.** 495.

In Brief

Surgery of the Reproduction Organs

The outstanding development of recent years is the establishment of bovine caesarean section as a practical and useful treatment of certain forms of dystokia. The several variations in technique centre chiefly around choice of anaesthesia and site of laparotomy. With the amendment of the Anaesthetics Act, 1954, various types of regional anaesthesia, *viz.* epidural, paravertebral, and field infiltration are now permissible. A considerable advantage of paravertebral and field infiltration is that the operation may be performed through a flank incision in the standing animal.

In sheep, paravertebral anaesthesia has become the method of choice for caesarean sections, and these operations are performed with increasing frequency, particularly in the treatment of " ringwomb."

In canine dystokia, the drug thiambutene alone, or followed by ether, is gaining in popularity for caesarean operations. There is here the added advantage that a pharmacological antidote, nalorphine, completely antagonises thiambutene so that following the operation, by a simple injection, the bitch and newborn puppies may be restored at once to full consciousness.

Recurrent prolapse of the vagina in the late gestational cow has always been an awkward proposition for the practitioner. Of late, three new methods for its treatment have been introduced:—

(a) Submucous resection of the prolapsed organ (Farquharson, 1949).

(b) A modified Caslick's operation in the vulval labiae with consequent reduction in the vulval orifice (Roberts, 1949).

(c) Neurectomy of the internal pudic nerve with a view to desensitising the vagina and thus preventing further straining (Watts, 1954).

In the male, perineural injection (nerve block) of the internal pudic nerve causes relaxation of the retractor penis muscle and thus the penis of the standing bull may be extruded for examination, diagnosis, or surgery. The nerves, one on each side, lying on the inner face of the sacro-sciatic ligament are located by a hand in the rectum. With the other hand a needle is inserted through the ischio-rectal fossa and passed alongside the rectum towards the directing finger in the rectum, and the nerve infiltrated. The procedure is repeated for the other side. The method, although tedious, is superior to epidural injection in that there is no fear of the animal falling (Larsen & Bartlett, 1953).

G. H. ARTHUR (December, 1955).

References

FARQUHARSON (1949). *Rep. 3rd Intr. Vet. Congress.* London.

LARSEN, L. L., & BARTLETT, E. E. (1953). *Amer. V.M.A. Proc. 90th An. Mtg.* 407–9.

ROBERTS, S. J. (1949). *Cornell Vet.* **39.** 433.

WATTS, R. E. (1954). *Amer. V.M.A. Proc. 91st An. Mtg.* 382–4.

Cerebral Glioma in a Cow

BY

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Introduction

BRAIN tumours in the ox are rather infrequently described. Fankhauser (1947) reported two gliomas in cows diagnosed as glioblastoma multiforme; one of these cases showed at the same time several meningiomas. Cordy (1953) described a medulloblastoma in a steer. It may be that these and other neuropathological conditions occur more frequently than is reported in the literature, as brains of cases showing nervous symptoms are seldom examined carefully *post mortem* and an accurate diagnosis made. A great deal of this valuable material which is especially important in comparative studies is, therefore, lost to the pathologist.

The following case of glioma in a cow is reported:

Clinical History

Three-and-a-half-year-old pedigree Guernsey cow. Symptoms exhibited over a period of six weeks consisted primarily of persistent circling movements in a clockwise direction.

Gross Pathology

The specimen, which comprised the tumour only, was fixed in formalin when received for examination. It would be advantageous if in such cases the whole brain could be preserved for examination using 10 per cent. formol saline. No attempt to separate an obvious neoplasm from its surroundings should be made, as this makes its localisation and classification in some instances difficult or impossible. It is important to preserve the tumour's relationship with surrounding tissue in order to assess its influence on the normal architecture of important contiguous structures.

The tumour, stated to have been recovered from a lateral ventricle, was well circumscribed and measured 7 by 5 by 4 cm. (Fig. 1). The peripheral part was of a rubbery consistency; a few haemorrhages were present in it.

The central portion was soft and crumbly, and partly necrotic. Small cystic spaces were found in it and there was a recent haemorrhage of considerable size, presumably due to shooting. (It may be emphasised that practitioners who collaborate with the pathologist would do much to help in such cases by seeing that the animal is not destroyed by shooting, as the haemorrhage and tissue damage add to the difficulties of interpretation.)

Histopathology

Paraffin sections were stained by H.E., van Gieson, Mallory's P.A.H., and Masson's trichrome.

The cells vary in shape and size; some are rounded, some elongated, and others polyhedral in shape. Most of the cells have little cytoplasm. Some of them show mitosis. In parts of the tumour the cells are accompanied by many glial fibres (Fig. 2). These regions present the histological picture of an astrocytoma. In other parts the cells have a honeycombed appearance, having a spherical nucleus surrounded by an unstained halo (Fig. 3). These areas have the appearance of an oligodendroglioma. The tumour is supplied by numerous blood vessels which have thin collagenous walls, and lie in thick irregular branching fibrous strands (Fig. 4). The many capillaries show endothelial hyperplasia as a non-specific reaction of the endothelial cells. This is often found in the glioblastoma multiforme as well as in the astroblastoma. Haemorrhages as well as regions of necrosis are present in the neoplasm.

Discussion

The tumour is a rapidly-growing glioma as evidenced by the presence of mitotic figures, the regions of necrosis, and the haemorrhages. Growth has taken place by expansion rather than by infiltration. Parts of the tumour have elaborated glial fibres and have the histological appearance of an astrocytoma. Other parts, however, present the histological picture seen in an oligodendroglioma. In this case, as often with gliomata, it is impossible to classify the tumour exactly; also, changes in the surrounding tissue could not be studied as these parts were not submitted for examination.

References

CORDY, D. R. (1953). "Medulloblastoma in a steer." *Cornell Vet.* **43.** 189–93.

FANKHAUSER, R. (1947). "Gliome beim Rind." *Schweiz. Arch. Tierheilk.* **89.** 438–43.

NEW RATES FOR CLASSIFIED ADVERTISEMENTS

As from the first issue in the New Year, that of January 5th, Council has approved new rates for classified advertisements in THE VETERINARY RECORD. The increase is regretted, but has been made necessary by the fact that the present rates no longer meet the cost of setting up in type, to say nothing of clerical labour. The rates were fixed many years ago and are now quite out of touch with current costs.

The new rates are:—

For Members: 2s. 6d. for each six words or less, minimum 7s. 6d.; repeat advertisements 1s. 6d. for each six words, minimum 4s. 6d.

Public Bodies, etc.: 3s. 9d. for each six words or less (minimum 18 words); repeat advertisements 2s. 3d. for each six words.

The box number fee remains at 2s. 6d. and should only be paid *once*, irrespective of the number of insertions.

Advertisers would help the clerical staff very much by correctly counting the words in their advertisements and sending in the appropriate fee *plus the box number fee.*

FIG. 1.—Cut surface of the tumour showing its well-defined shape, its haemorrhages, cystic spaces and the necrotic centre.

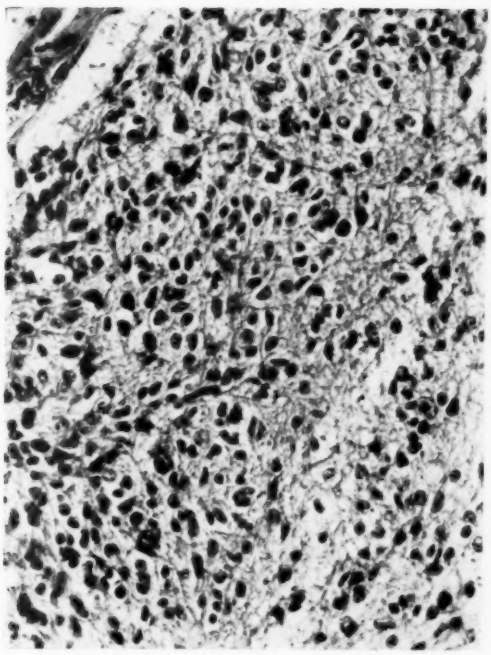

FIG. 2.—Part of tumour with astrocytic fibres. Mallory's P.A.H. × 305.

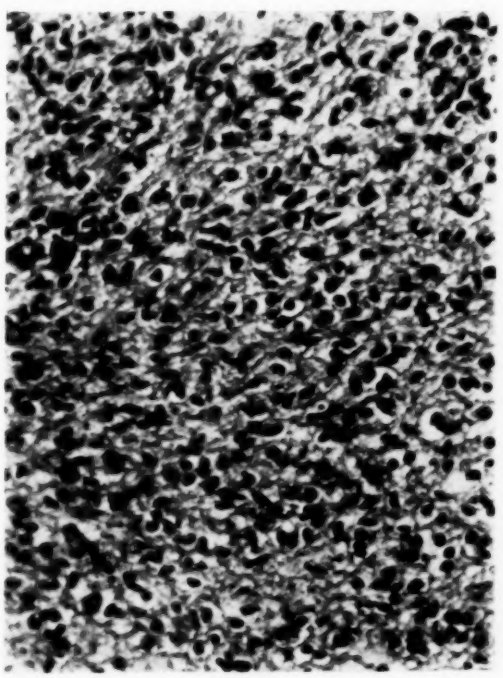

FIG. 3.—Tumour cells with perinuclear halo. Masson's trichrome. × 350.

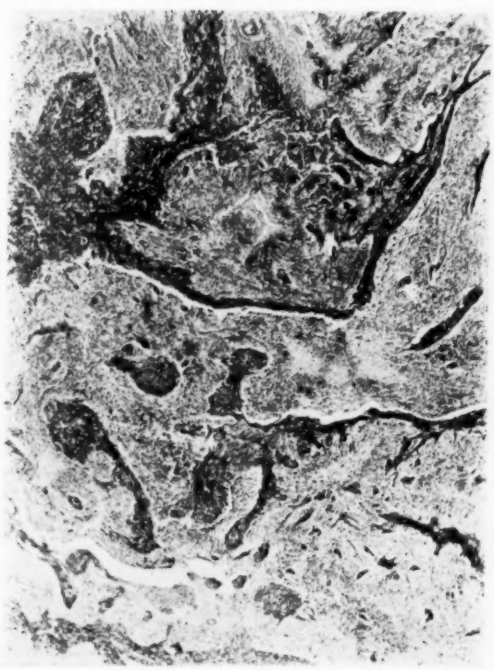

FIG. 4.—Irregular branching fibrous strands with the tumour cells in their meshwork. van Gieson. × 25.

Some Aspects of Renal Disease—Part II. Therapeutics in Renal Disease

BY
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IT is widely recognised that the introduction of sulphonamides and antibiotics has enabled the clinician to attack renal diseases at their origins and not to rely solely, as in the past, on palliative treatment.

Antibiotics

Penicillin and, particularly, streptomycin have altered the course of renal disease, and there is already evidence of this in the literature. The therapeutic use of antibiotics in the early stages of leptospiral infection is reducing the incidence of interstitial nephritis in dogs. Bloom (1954) has reported that many dogs dying, from different causes, years after a leptospiral infection, having had antibiotic treatment, revealed no lesions or only local scarring in the kidneys. This is of great importance, particularly as Bloom has done much on the clinical and pathological study of nephritis in dogs. Davies (1954) noted a marked decline in the carrier state of leptospira in 70 unselected sera from dogs, from 27 to 2.8 per cent. during 1948-54. The suggestion is that the use of antibiotics may be responsible for this decline. Numerous references exist on the value of antibiotic treatment in these diseases, and the work of Brunner & Meyer (1949) has further indicated its value for removing carriers of leptospiral infection.

Other urinary tract infections are caused by a variety of organisms, such as coli, proteus, streptococci, and staphylococci; this indicates the importance of knowing the infecting organism before an antibiotic is prescribed. Such information can only be acquired by cultural methods, to identify the micro-organism and its sensitivity to a suitable antibiotic. At present such tests are very difficult to arrange in veterinary practice, and some form of treatment must be given, even when laboratory facilities are available, pending confirmation of diagnosis.

Again, in renal diseases more than one type of infective organism may be present. It would appear that bacteriological examination as well as urine analysis will become essential with the progress of antibiotic treatment in renal disease.

In this country the use of penicillin and streptomycin in renal diseases has given excellent results. The earlier use of sulphonamides, first alone and later in combination with penicillin, has been largely superseded by the use of penicillin and streptomycin together. A brief consideration of the individual antibiotics used in renal diseases follows.

Penicillin

Its rapid absorption and renal excretion after parenteral administration is well established in most species. About 20 per cent. of the dose is excreted by the glomeruli and about 80 per cent. by the tubules. Its lack of toxicity and side effects, its inability to produce resistance in infecting organisms during treatment, and its ease of administration, have made it an almost ideal substance for the treatment of disease. It is still the first antibiotic to be used in most renal dysfunctions, and with good results. The concurrent use of agents that block tubular excretion of penicillin, such as carinamide, diodone, or *p*-aminohippuric acid " without seriously affecting kidney function " (Sheidy, 1953), must be treated with caution.

Streptomycin

This is readily absorbed and excreted after parenteral administration. In dogs, 60 to 80 per cent. of the drug is excreted in the urine within 24 hours after such administration (Stebbins *et al.*, 1945). Oral administration produces only small amounts in the blood, nearly all being lost in the faeces. The most rapid excretion is within the first four hours and the greater part is excreted during the 12 hours after injection. If renal damage is present, marked irregularities in excretion may result.

Streptomycin is more active in alkaline urine: when treating nephritis, particularly in dogs, an alkalising agent should be used. Oral administration of sodium bicarbonate, or potassium or sodium citrate two or three times daily is advisable. From adequate doses for three to five days no cases of neurotoxicity have been encountered, provided that terminal stages of the disease have not been reached, when uraemia may be well advanced and all antibiotics may fail.

Tetracyclines (chlortetracycline*, oxytetracycline†)

These reach the urine at fairly high concentrations; they are more active in acid than alkaline urine, and several organisms causing renal infections are sensitive to these substances. As to other antibiotics differences of sensitivity are encountered between different strains of the same species of infecting organism.

Chloramphenicol

Given orally this is rapidly absorbed from the intestinal tract and is excreted *via* the kidneys. Compared with other antibiotics its amount excreted in the active form in the urine is low (Glazko *et al.*, 1950; Welch, 1954). Approximately 90 per cent. of the administered dose may be accounted for in the urine within 24 hours, but probably less than 10

* Aureomycin.
† Terramycin.

per cent. of the administered dose is excreted unchanged, the greater part being excreted as an inactive nitro compound. This lowered excretion does not necessarily imply that activity is correspondingly low in clinical cases.

Some cases of canine nephritis respond well to chloramphenicol, but cases of cystitis due to proteus infection, which is sensitive to both streptomycin and chloramphenicol, respond less well to the latter. It is likely that in such an instance the sensitivity of the organism is an unambiguous guide to choice of the antibiotic for treatment, since most of it is excreted in the inactive form. In human subjects organisms of the coli aerogenes group causing renal disease have been successfully combated by chloramphenicol; in domestic animals much more investigation is required of its uses in renal disease. Prolonged use of this antibiotic is contra-indicated on account of the danger of anaemia, particularly, as in cases of canine nephritis anaemia is frequently already a concurrent complication.

Other Antibiotics

Polymixin B and E reach a high level of concentration in the urine, but with these signs of nephrotoxicity are possible and these substances are not in use for animals.

No one should assume that all aspects of treatment of renal disease are already covered. The introduction of more recently discovered antibiotics should enable us more effectively to adapt our choice of drugs to the infecting organism present. It will also become possible better to assess the success of therapy—that is, whether the right antibiotic has been chosen—when opportunities exist to carry out urine and bacteriological examinations, before and after treatment. That may seem to be an ideal way of treatment, but it is the *only* way of ensuring as far as possible that genuine cure has occurred. An illustration of this point can be seen from an analysis of human therapy (Gould *et al.*, 1953).

Here streptomycin has been the most valuable antibiotic for the treatment of renal diseases.

Dextran

A recent development in the treatment of certain stages of nephritis in dogs is the intravenous use of dextran in uraemia and dehydration. In human nephrosis, oedema can be relieved by diuresis after the intravenous administration of dextran (Wallenius, 1950), and such use has also been considered for treating nephritis (Platt, 1952). Clinical reports indicate that in subacute, or even in some stages of chronic nephritis in which vomiting is frequently present, particularly in gastro-intestinal uraemia, dehydration and collapse may occur. The intravenous infusion of dextran (6 per cent. in normal saline) in doses of 100 to 200 c.c., depending on the size of the dog, for a period of two or three days, has produced good clinical results, gradual disappearance of dehydration, cessation of vomiting, and occasionally apparent restoration to the original state of health (Birrell, 1955). It is realised that in such cases a relapse is probable and that the improvement may be only temporary. It is, however, well known that any reprieve is welcome in the dog that is a pet of the family, for the owners value even temporary improvement.

Having classified renal diseases, and possessing the necessary techniques for diagnosis and access to the right therapy, it is suggested that the clinician has now many weapons with which to reduce the incidence of these diseases.

Conclusion

Emphasis has been laid here on the use of modern techniques in diagnosis. The incidence of neoplasia should be further investigated. Much more statistical information is required on the evidence for the occurrence of renal disease, particularly in large animals, and this should be forthcoming both from clinicians and from slaughter-houses.

Analytical and bacteriological examinations, and the use of the appropriate antibiotic should enable the clinician to reduce the incidence of renal disease, and radiology will further improve diagnosis, making it possible for the clinician to carry out surgical procedures on small animals. It is only by accurate diagnosis, classification, and treatment of renal disease, and by correct case recording, that urology can be given its proper place in veterinary medicine.

References

Annotation. (1953). *Lancet.* **264.** 332–3.
ARTHUR, G. M. (1949). *Vet. Rec.* **61.** 257.
BECK, J. D., DEMOTT, T., & BOUCHER, W. B. (1945). *Univ. Pen. Bull. Vet. Ext. Quat.* **100.** 10.
BIRRELL, E. (1955). Personal communication.
BISHOP, E. J. (1953). *J.A.V.M.A.* **123.** 1,187.
BLOOM, F. (1954). "Pathology of the dog and cat—genito-urinary system with clinic consideration." Am. Vet. Pub. Inc. 1954.
BROOM, J. C. (1949). *Vet. Rec.* **61.** 127.
BODDIE, G. (1935). *Ibid.* **15.** 219.
———. (1950). "Diagnostic Methods in Veterinary Medicine." Oliver & Boyd, London.
———. (1944). *Ibid.* Oliver & Boyd, London.
BRODEY, R. S. (1955). *J. Am. Vet. Mass.* **126.** 934.
BRUNNER, T. K., & MYER, K. F. (1949). *Proc. Soc. Exp Biol. & Med.* **70.** 450–2.
BUTTON, R. A., & BUTTON, O. G. (1941). *J.A.V.M.A.* **98.** 392.
COLES, E. H. (1953). *Vet. Med.* **48.** 480.
CRAIGE, A. H. (1940). *Univ. Pen. Bull. Vet. Ext. Quat.* **XL. 77.** 3.
DAVIES, M. E. (1954). *Vet. Rec.* **67.** 35.
DRURY, F., DYCE, K. M., & MERLEN, R. H. (1953). *Ibid.* **65.** 647.
EASTERBROOK, H. L., HELMBOLT, C. F., & PLASTRIDE, W. N. (1955). *Vet. Med. L.* **3.** 114.
ENDERLEN, F. (1819). *Deutch Zeit. f. Tiermedizin.* 17.
FOX, F. M. (1947). *Cornell Vet.* **37.** 59.
FREIERMUTH, G. J. (1944). *J.A.V.M.A.* **105.** 145–6.
GLAZKO, A. J., DILL, W. A., & REBSTOCK, M. C. (1950). *J. Biol. Chem.* **183.** 679.
GOULD, J. C., BOWIE, J. H., & CAMERON, J. D. (1953). *Lancet.* **264.** 361–4.
HADLOW, W. J., & STOENNER, H. G. (1955). *Am. J. Vet. Reg.* **XVI.** 45.
HARE, T. (1934). *Proc. Roy. Soc. Med.* **27.** No. 7, 7960801 and 805.
HEMSLEY, L. A. (1955). Personal communication.
HENDERSON, W. (1938). *Vet. Rec.* **50.** 1,328.
HICKMAN, J. (1954). *Ibid.* **66.** 805.
HILL, D. (1950). *Vet. Med.* **45.** 350.
HOGG, A. H. (1948). *Vet. Rec.* **61.** 117.
JONES, T. L. (1952). *Canad. J. Comp. Med.* **16.** 153.
JOSHUA, J. O. (1949). *Vet. Rec.* **61.** 714.
KEELER, C. E. (1940). *J.A.V.M.A.* **96.** 507–10.

TABLE I

ANALYSIS OF CASES*

Diagnosis	Infecting organism	Sensitivity of infecting organisms (μg. per ml.) P	S	C	A	O	Antibiotic chosen	Dosage 6-hrly. (mg.)	Mean assay value of urine (μg. per ml.)	Clinical result of urinary condition After 1st course of antibiotic	Bacteriological result of urinary condition After 1st course of antibiotic
Pyelonephritis, mitral stenosis	*Bact. coli*	3	0·2	4·5	250	50	Streptomycin	1·0	0·33	Cure	Sterile
Pyelonephritis	*Bact. coli*	2·25	0·5	3·0	200	50	Chloramphenicol	60	2·5	Cure	Sterile
Pyelonephritis, respiratory infection	*Bact. coli*	30	0·3	4·5	250	25	Chloramphenicol	100	15	Cure	Siterle
Renal calculus, pleural effusion	*Bact. coli*	30	1·0	1·5	0·5	3	Streptomycin	7	2	Cure	Sterile
Acute pyelonephritis	Enterococcus, staphylococcus	3·0 0·05	7·5 0·05	4·0	0·25	3·5	Penicillin, streptomycin	4 0·2	8	Cure	Sterile
Prostatic obstruction, hypertrophic cystitis	Enterococcus	0·1	0·2	2·5	0·2	1·0	Penicillin	0·12	0·25	Cure of infection; referred for surgical treatment	Sterile
Malabsorption syndrome, pneumoconiosis, cystitis	Coliforms, enterococcus, *Staph. aureus*	3 3	0·5 125	8 13	250 250	50 50	Streptomycin chloramphenicol	4 750	55	Cure	Removal of enterococci and all 3 coliforms; *Staph. aureus* persisted
Acute cystitis	*Bact. coli*	30	2·5	8·5	200	25	Streptomycin	12	6	Cure	Sterile
Pyelonephritis, congestive cardiac failure, hemiplegia	Streptococcus	30	25	6	0·04	1·25	Aureomycin	0·8	1	Symptomatic improvement	Sterile
Pyelonephritis, diabetes mellitus	Coliforms, enterococcus, actinomycete	3 3 0·012	5 25 0·02	8 5 1	7·5 0·25 1·25	2·5 1·25 50	Chloramphenicol	100	12	Symptomatic relief	Modified
Pyelonephritis, diverticulitis	*Bact. coli*	4	0·3	7·5	20	6	Streptomycin	22·5	3	Cure	Sterile
Pregnancy, pyelonephritis	*Bact. coli*	8	0·5	6	30	20	Streptomycin	3·13	2	Symptomatic cure	Sterile
Chronic pyelonephritis, renal failure	*Bact. coli*	30	25	3·0	200	25	Chloramphenicol, aureomycin	—	—	Urine clear, continuing renal failure	Sterile
Pyelonephritis	*Bact. coli*	3	0·6	1·0	0·25	1·25	Streptomycin	4	1·5	Cure	Sterile
Pyelonephritis	Enterococcus	0·05	6·0	1·0	0·2	0·125	Oxytetracycline	2·4	2·5	Cure	Removal
Pregnancy, pyelonephritis	Enterococcus	1·5	17·5	12·0	0·5	2·0	Aureomycin	0·75	0·5	Cure	Sterile
Chronic pyelonephritis	*Bact. coli*	11	0·15	2·5	200	6	Streptomycin	16	1·5	Cure	Sterile

A, aureomycin ; C, chloramphenicol ; P, penicillin ; S, streptomycin ; O, oxytetracycline.

*GOULD *et al* (1953).

KENDRICK, J. W. (1950). *Cornell Vet.* **40.** 187.
KIESAL, G. K., MORSE, E. V., & EVANS, W. M. (1947). *Cornell Vet.* **37.** 373.
KING, N. S., & UVAROV, O. (1935). *Vet. Rec.* **15.** 533.
KNIGHT, G. C., & Douglas, S. (1943). *Ibid.* **55.** 195.
KRABBE, A. (1949). *Ibid.* **61.** 751.
LARSEN, N. B., & TARDERING, E. (1954). *Nord. Vet. Med.* 35–46.
LEONARD, E. P., RICKARD, C. G., & MCENTEE, K. (1953). "Canine Medicine." Am. Vet. Pub. Inc. Illinois.
LIEGEOIS, F., & DERIVAUX J. (1946). *C. R. Soc. Biol. Paris.* **140.** 1,143.
LINDSAY, R., & BRUCE, R. (1955). *N. Am. Vet.* **36.** 304.
LOVELL, R., & COTCHIN, E. (1947). *Vet. Rec.* **57.** 20.
———. (1951). *Ibid.* **63.** 645.
MARCONE, C. (1906). *Rev. Gen. de Med. Vet.* **7.** 345–60.
MEDWAY, W., & BISHOP, E. J. (1955). *N. Am. Vet.* **36.** 125.
MEDWAY, W. Z., & NIELSEN, S. (1954). *Ibid.* **35.** 920.
M'FADYEAN, J. (1929). *J. Comp. Path.* **42.** 58, 141, 231.
———. (1931). *Ibid.* **XLIV.** 266.
MCKENNA, W. R. (1949). *Vet. Rec.* **52.** 882.
MCINTYRE, W. I. M., & STUART, R. D. (1949). *Ibid.* **61.** 411.
MORRISON, H. R. (1940). *Am. J. Roentgen.* **44.** 537.
MORSE, E. (1950). *Cornell Vet.* **40.** 178.
MOWDER, W. H. (1940). *Vet. Med.* **35.** 659.
NIELSEN, S., & ARCHIBALD, J. (1955). *N. Am. Vet.* **36.** No. 1, 36.
PARKER, E. (1954). *Vet. Rec.* **66.** 176.
PETRENKO, B. G. (1951). *Veterinariya.* **28.** No. 2, 26–9. Moscow.
PLATT, H. (1951). *J. Comp. Path.* **61.** 140–9.
———. (1951). *Ibid.* **61.** 189–214.
PLATT, R. (1952). *Brit. Med. J.* **2.** 609 & 660.
PLUMMER, P. J. (1951). *Canad. J. Comp. Med.* **15.** 231.
POLLOCK, S. (1955). *J.A.V.M.A.* **126.** 188.
POPPENSIEK, G., & BAKER, J. A. (1951). *Proc. Soc. Exper. Biol. Med.* **77.** 279.
PRIER, J. E., THOMAS, R. M., & BRAMLETT, R. G. (1952). *Vet. Med.* **47.** 459–60.
PUNTRIANO, G. O. (1954). *J.A.V.M.A.* **124.** 55.
———. (1953). *Veterinarian.* **14.** 13.
———. (1955). *Am. J. Vet. Reg.* **XVI.** 101.
REHFELD, C. (1954). *Vet. Med.* **49.** 531–2.
SAVAGE, A. R., & ISA, J. (1954). *J.A.V.M.A.* **124.** 185.
SCHNELLE, G. (1950). "Radiology in Small Animal Practice," N. Am. Vet. Incorp., Illinois.
———. (1954). *N. Am. Vet.* **35.** No. 11, 843.
SHEIDY, F. S. (1951). "Antibiotic Therapy in Veterinary Medicine." *J.A.V.M.A.* **118.** 213–20.
———, & BUNN, C. E. (1953). *Vet. Rec.* **65.** 779.
SINHA, S. K. (1952). *Indian Vet. Jnl.* **28.** 453–7.
SJÖBERG, K., & NILSSON, F. (1940). *Svensk Vet. Tidsk.* **45.** 197.
STEBBINS, R. B., GRAESSLE, O. E., & ROBINSON, H. J. (1945). "Studies on Absorption of Streptomycin in Animals." *Proc. Soc. Exper. Biol. & Med.* **60.** 68.
SWINGLE, K. (1953). *Am. J. Vet. Reg.* **14.** 493.
UVAROV, O. (1936). *Vet. Rec.* **48.** 449.
———. (1944). *Ibid.* **56.** 237.
WALLENIUS, G. (1950). *Scand. J. Clin. Lab. Invest.* **2.** 228.
WEIPERS, W. L. (1951). *Vet. Rec.* **62.** 659.
WEITZ, B. (1947). *J. Comp. Path.* **57.** 191.
WEITZ, W. L., & MCLELLAND, R. B. (1940). *J.A.V.M.A.* **97.** 605.
WELCH, H. (1954). "Principles and Practice of Antibiotic Therapy." Med. Enc. Inc.
WHITE, E. G. (1944). *J. Comp. Path.* **54.** No. 1, 16–24.
WRIGHT, J. G. (1934). *Proc. R.S.M.* **XXVII.** 802–3.
———. (1936). *B. Vet. J.* **92.** 261.
YOUNG, G. B. (1955). *Vet. Rec.* **67.** 15.

THE DISCUSSION OPENED

The discussion was opened by Mr. J. Pasfield who said:—

"Miss Uvarov has complained that the literature on renal disease among large animals is very scanty. I am unable to subscribe to this view since, on being asked to read up the subject, I have found a great deal of written work contained in about 20 volumes. From the point of view of the practitioner, and certainly from that of the unfortunate student, the subject may be said to have been positively over-written!

"The classification of renal diseases leaves much to be desired. It is obvious that so complex a condition will be approached in a variety of ways; for example most text-book classifications are based on pathological or *post-mortem* observations. They are seldom approached from the clinical standpoint. To illustrate this point we have the classification of nephritis as acute, subacute, and chronic, but it is possible to argue that in practice the order should read subacute, acute, chronic. This variation of approach reflects the weakness of veterinary text-books in that, in many cases, they are based upon human literature. In the following remarks I have attempted a simple classification which should meet the purposes of the agricultural practitioner.

"Simple congestion may be either active or passive. The active form develops as a result of increased blood pressure in the aorta in the course of febrile conditions and before the onset of inflammation. It has been observed in bovine myocarditis where no other lesions were present; it may also be the result of dietetic errors, *e.g.* mouldy food (bed-wetting by thoroughbreds), mow burnt hay, excessive sugar, or from the ingestion of grains fumigated with sulphur. It is also the result of trauma following accidents to small animals and may be self-inflicted in large-animal dystokia or during recumbency. The condition is characterised by increased urine of lighter colour (sometimes blood-stained) and of reduced specific gravity. As well as the symptoms of shock we sometimes observe posterior stiffness and tenderness over the loins. Passive congestion is usually part of a general venous stasis. It may also be due to pressure on the renal veins by thrombus or by enlarged mesenteric glands, or from thrombosis of the posterior vena cava. It is also associated with pulmonary emphysema of horses and cattle, with bovine pleuro-pneumonia, with vulvular heart disease and with destructive lung conditions. It is usually severe and is characterised by decreased urine of higher specific gravity, varying degrees of haematuria and albuminuria, considerable loss of condition, and bowel stasis. It is said that, in its early stages, as a result of the skin assuming some of the excretory functions of the kidneys, a glossy coat develops, but I have been unable to observe this. In its later stages a scurfy, dry, urinous eczema appears. In the adult bovine the latter symptom may be confused with chronic ectoparasitism. Chronic passive congestion usually leads on to generalised oedema, uraemic convulsions, and death.

"It is interesting to consider the hypertrophy which occurs in one kidney to compensate for atrophy in the other, produced perhaps as the end result of congestion. Compensatory hypertrophy is the good fortune of paired organs, as without this phenomenon the death rate from uraemia would be considerably higher. In this connexion the shape and size of kidneys among the different domestic animals leads us to speculate upon the reason for the marked lobulation of these organs in the bovine species. I feel that its purpose must be to localise ascending infection, and I propose to return to this subject a little later.

"In acute nephritis the kidneys are swollen and pale, the capsule strips easily, and there are numerous small haemorrhages in the substance of the organ. The condition may be toxaemic, and is observed in such specific diseases as swine fever and strangles. It may also be a sequel to such extensive skin lesions as burns, mange, eczema, and diffuse ringworm. Those dietetic errors capable of producing acute congestion may also produce acute nephritis, and in addition such chemical irritants as turpentine, carbolic acid, resins, cantharides, and potassium nitrate need to be considered. The condition may be the unfortunate sequel to prolonged general anaesthesia with chloroform or ether. In turpentine poisoning of the horse the urine is reduced in quantity, is thick and sticky, and has a distinctive smell of violets. In general there is increased turbidity of the urine and sometimes haematuria; the back is arched and the posterior gait stiff, with pain in the lumbar region and frequent attempts to micturate. The appetite is capricious and rumination in cattle may cease. The temperature is raised some two to four degrees, the pulse is full and wiry to the touch. Gradual loss of condition is followed by dehydration and uraemia.

"The condition known as subacute nephritis is, I feel, mainly of academic interest. If it is considered as a prelude to the acute condition, the professional attendant is usually called too late to observe it; if on the other hand it is considered as a half-way house between the acute and the chronic condition, its gradation of symptoms is so fine as to be frequently imperceptible.

"Chronic nephritis is essentially a proliferation of fibrous tissue within the kidneys. The condition may occur in old age as an extension of generalised arterio-sclerosis or as a sequel to acute nephritis. Thus we talk of a primary contracted, or granular, kidney if it is the result of arterio-sclerosis and of the secondary granular kidney if the result of infection. The latter is frequently fatal and is characterised by inappetence, severe loss of condition, oedema, thirst, vomiting, foul breath, and a brown deposit on tongue, gums, and mouth.

"Pyaemic nephritis is associated with infection of the blood-stream and is almost invariably bilateral. It is a sequel of endocarditis, navel-ill, joint-ill, streptococcal and staphylococcal pyaemias, and in the foal, *Shigella viscosum*. The symptoms are usually masked by those of a general infection

"An apparently unclassified type of nephritis occurs as an extension of peritonitis, *i.e.* by infection from without through the serous coat. It has been observed to occur as a result of congenital rupture of the bladder in the new-born foal (whether a congenital abnormality or a mechanical rupture of the distended bladder while passing through the maternal pelvis is still a matter of conjecture). Forced service by the bull into the bovine urethra is capable of rupturing this organ and the subsequent dribbling of urine into the peritoneal cavity sets up a general adhesive peritonitis in which one or both kidneys may be involved.

"Pyelitis and pyelonephritis are conditions of considerable interest in large-animal practice. They are said to be ascending infections developing from the female genitalia and travelling *via* the urethra. The recoverable organism is generally *C. pyogenes* in association with *C. renale*. In this connexion we may usefully consider why, in view of the fact that the bovine uterus is capable of containing large amounts of grossly septic material without apparent danger, the condition is not much more frequently encountered. It seems possible that the marked lobulation of the bovine kidney may be intended to wall off infection into small areas and that the suburethral diverticulum may have a specific rôle in shutting out infective material which frequently lies in the bovine vagina.

"Infarcts commonly occur in kidneys as a result of subclinical infections which deprive areas of tissue of their blood supply. These areas shrink, lose colour, and undergo necrosis. The condition appears to be much more common in the pig than in any other farm animal. For example I quote statistics kindly supplied by the senior sanitary inspector in charge of the Horsham Urban District abattoir which indicates that in 6,465 pigs slaughtered, anaemic infarcts (associated with heart lesions and probably following swine erysipelas) were observed in 22 kidneys. In contrast, hydronephrosis was observed in only seven kidneys and nephritis in four.

"Nephrolithiasis, or kidney stone, is not a condition of importance among farm animals, but parasitic infestation of the kidney is more frequently encountered. Parasites commonly observed are *Dioctophyme renalis* in the dog, cattle, horse, and sheep, *Strongyle* larvae in horses, *Stephanurus dentatis* of the pig, *Echinococcus* cysts in ruminants, and *Cysticercus cellulosae* in the pig.

"The kidneys are also seriously involved in such specific conditions as Rubarth's disease of the dog, pulpy kidney disease of sheep, swine fever, and to a much lesser extent in actinobacillosis and tuberculosis. Large haemorrhages into the parenchyma of the kidney, with subsequent death, have been observed in man following exposure to gamma-ray radiation, and it is a possibility that at a future date similar lesions may be seen in farm animals.

"The diagnosis of nephritis presents certain difficulties on the farm. Many of the premonifory symptoms are insidious and are easy to confuse with those of other wasting diseases in which dehydration eventually predominates. Miss Uvarov has rightly paid great attention to the routine examination of urine samples in the dog, but I doubt if this procedure is so simple or so trustworthy among farm animals. The catheterisation of cows and mares (which ought to be a routine procedure in cases of colic and milk fever) would be greatly facilitated by a safe type of metal catheter, which it is my contention we do not possess. The collection of urine samples from male farm animals is frequently very troublesome and may have to be left in the hands of attendants; such samples are often grossly contaminated. The results of such examinations are not of great value unless they can be correlated with the clinical picture. For example albumen may be found in any febrile condition where the kidney is ineffectually filtering; blood may be found in azoturia and piroplasmosis; oxalates are excreted when beet tops are fed; acetone gives a positive Rothera in acetonaemia, Johne's disease, traumatic reticulitis, most chronic infectious conditions, and in debility and old age.

"Although more nephritis of farm animals may exist than is generally thought to be the case, I do not feel that the condition among farm animals is a serious economic factor. In this connexion I again quote figures of the Horsham abbatoir covering 2,490 cattle slaughtered in 1954. Among these animals only four cases of tuberculosis of the kidney and two of chronic nephritis were observed *post mortem*."

The General Discussion

Many members subscribed to the discussion and the points raised were as follows:—

Statistics of renal disease from abattoir records would not include those cases where dehydration was marked—a large percentage—which would be dealt with at knacker-yards. No doubt figures would vary enormously with the district. The reason suggested for lobulation of the bovine kidney was not quite clear. The lobulation would produce a much larger surface area which would surely be more liable to infection *via* the peritoneal route. Infarcts had been found in a pig kidney where the only other finding was a large number of ascarids, and it was suggested that a stray larva migrating *via* the blood stream might have been the cause. Pig kidneys might be more susceptible to infarction as it was more often found in them. The length of time some animals existed with nephritic conditions was surprising. In leptospirosis, what should be the period of treatment with streptomycin? Was a week sufficient, or would 10 days be better? Daily injections were not always easy to arrange. Chlortetracycline* and oxytetracycline† had also been tried. After removal of renal calculi it was found so often that there was recurrence, especially in the dog. Similarly with sabulous material in the cat. Some means of preventing this would be invaluable and perhaps the speaker would comment. Further information would be welcomed on uraemic asthma, particularly on the clinical aspects, onset, and how soon after the uraemia was present the asthma occurred. A chronic type of nephritis, due to a fungus infection, had been reported, where the lesions in the kidney grated on cutting. It seemed that the infection was transmitted in some way by rodents. Some further information on this condition would be appreciated. More detail was requested on the treatment of cystitis in cats following the removal of urethral obstruction. In leptospirosis the value of blood sampling was raised, as frequently a case diagnosed clinically, and which responded to treatment with streptomycin, was later reported negative on test. Could this be due to too early sampling? The injection of streptomycin was followed, in about 5 or 10 minutes in some cases, with violent vomiting which made the patient's condition much worse, at least for a time. Also, especially in cats, there was shaking and trembling. Could these reactions be avoided in any way. The use of small doses of streptomycin, in an effort to avoid reactions, might explain some of the failures in treatment. Urinary calculi in dogs were practically unknown in one district and it was questioned if the water supply could have any bearing on this apparent freedom. Several speakers expressed the view that chronic nephritis was less common than formerly.

* Aureomycin.
† Terramycin.

The Speaker's Reply

In replying to the discussion Miss Uvarov said that the classification given by Mr. Pasfield was very useful, though rather clinical; moreover, it did not fit the pathological picture. Oedema in association with renal disease had not been mentioned, and in the dog was infrequent. Specific diseases had been omitted from the discussion. Clinicians could get access to statistics on that aspect, but abattoir statistics were not widely quoted in veterinary literature. The figures quoted from Horsham abattoir were most interesting, and confirmed the statement at the beginning of the paper on the incidence of primary renal disease in large animals. All such information was valuable: it was regrettable that so much was unavailable because of lack of veterinary control of abattoirs or for other reasons. Diagnosis from X-ray films could only be carried out after some experience, as variations even in normal animals could be considerable. A series of X-ray films by Dyce and his colleagues demonstrated this point. Infarction as such had not received enough attention. They were not uncommon after injury and street accidents.

About urine composition, Mr. Pasfield had indicated a possible difficulty of interpreting the presence of albumen in several conditions. The clinician carrying out his own urine analysis was in a stronger position to interpret them than a laboratory worker doing so without knowledge of the patient's condition. Correlation of analytical findings and clinical symptoms was an advantage; additional tests, such as microscopical examination of urine deposit or determination of blood urea could be additional pointers to diagnosis. Debilitating and chronic diseases could also be sifted out from the case histories and duration of disease.

Regarding leptospirosis, the duration of streptomycin treatment partly depended on the stage of the disease. If treatment could be started before symptoms of renal involvement appeared, a course of four or five days was mostly sufficient, provided adequate doses were used. Such early diagnosis was not always possible: often some degree of renal impairment was present by the time a patient was presented for examination. The course of treatment must then be longer but should not exceed one week. Aureomycin and terramycin were also used in this condition, but streptomycin was almost specific for eliminating organisms already lodged in the kidney tubules.

The reaction to streptomycin described during the discussion apparently occurred only infrequently, and could be due to individual idiosyncrasy; moreover, it was known that amongst experimental animals cats were more sensitive to this antibiotic than other species. This antibiotic, if used in adequate doses for sharp and short courses of treatment seldom gave rise to these reactions.

Several views existed about methods of preventing calculi; they included the use of vitamin A, changes in diet, and an alteration of the chemical reaction of the urine. The type of calculi were also of importance; cystine calculi were fairly common in dogs and frequently caused urethral obstruction. If these were found, the urine should be kept alkaline in reaction as they readily dissolved in such a medium.

Lately, a new concept on the aetiology of urinary calculi and their prevention with hyaluronidase had been studied (Puntriano, 1953, 1954, 1955). This work has shown that in some species normal urine contains both colloids and crystalloids dispersed in an aqueous phase.

In some animals with calculi, Puntriano (1954, 1955) had found that colloids were absent; it was possible that this facilitated precipitation of crystalloids, which eventually, under certain conditions, might become real stones. The colloidal matter of urine included many different substances, such as nucleic acid, nucleotides, nucleosides, chondroitin-sulphuric acid, glycogen, and complex amino-sugars. Hyaluronidase was also said to be a normal constituent of urine. Puntriano had attempted prevention of kidney calculi in sheep by the use of hyaluronidase. He was able to show that crystalloid-colloid imbalance could be effected by using diets that predisposed to calculus formation. Inclusion of hyaluronidase in the diets prevented this imbalance.

In human urine, colloidal matter increased as a result of diet rich in protein; it was possible that nutrition might be a factor in determining the concentration of protective colloids in the urine of live-stock.

In some diseases the amount of urinary colloidal matter apparently decreased with the resultant deposition of crystalloids and ultimate stone formation. The use of hyaluronidase required further study. Its use by subcutaneous injections might reduce the tendency of calculi formation. It appeared from some work on human subjects (Hyaluronidase and Urinary Stones. *Lancet*. **264**, 332. 1953) that the use of hyaluronidase either prevented calculi forming or caused them to be less dense, and so to be passed more easily, the urine appearing less viscous and more watery. This treatment had to be extended over months, or even years, and was at present still in its experimental stage.

The clinician should see to it that an animal which had recovered from calculi had its urine tested regularly, special attention being paid to its reaction. The diet should be well controlled; if any organisms associated with secondary infection after calculus formation were present, an appropriate therapy should be employed.

Uraemic Asthma. The onset was somewhat indefinite, but it generally began with a symptom of the pharyngitis-tracheitis type, and at times a secondary congestion of the lungs apparently occurred. There was a husky cough of tracheal or upper bronchial origin. The duration depended on how far advanced the nephritis was. Palliatives and sedatives were helpful. The work of the kidney should be reduced as soon as possible, and appropriate treatment given.

Streptomycin. Treatment of leptospirosis was often begun with penicillin until the results of a blood test were available. Streptomycin should be used preferably from the beginning, certainly within 48 hours of the onset of symptoms. In any event this drug was indicated for most renal diseases, as one of the speakers had found in the absence of leptospiral infection.

The fungus mentioned could not be recalled as a cause of renal disease. A blastomycosis fungus, involving mostly lungs and skin could, by haematogenous dissemination, produce secondary lesions in the kidney, of a tubercle-like greyish-yellow colour. This was not common.

In cats, if cystitis persisted following retention of urine, the ideal procedure was to investigate the infection by bacterial examination of the urine and treat the causal organism. Generally cystitis disappeared quickly after urethrotomy, but sometimes it could become chronic and be difficult to treat. Collection of urine samples from cats presented no great difficulties.

Blood samples taken too early in leptospirosis could be misleading, and it was important to examine further samples at a later date. Urine examination should also be carried out. Some treatment was necessary pending results from these investigations. The use of antibiotics probably produced clinical improvement in 9 out of 10 cases treated—provided the terminal stage of the disease had not been reached. The vomiting and trembling reaction to the use of streptomycin, mentioned by one speaker, had not been experienced by Miss Uvarov even after using large doses of this antibiotic. If it were known that the patient showed this response to the drug, it might be necessary to begin treatment with penicillin or to use a mixture of streptomycin with dihydrostreptomycin, which reduced such side effects. Streptomycin must be given in large doses for short periods to obtain the best results, and to avoid dogs remaining carriers of infection.

HOSPITAL X-RAY FACILITIES

At a recent meeting of the West Suffolk Hospital Management Committee, a veterinary surgeon's request for X-ray facilities for one of his patients was discussed. Two doctors present explained that it was a general custom to grant such facilities to veterinary surgeons in special cases, and that, of course, the cost was always met by the veterinarian and was not a charge upon public funds. The Committee agreed to take no action which would interfere with this custom.

Current Literature

BOOK REVIEWS

Veterinary Clinical Diagnosis. PROFESSOR DAVID WIRTH. First English edition, translated and revised by Annie I. Littlejohn. Baillière, Tindall & Cox, London. Price 25s.

This volume is an English edition of Professor Wirth's Introducton to the Clinical Diagnosis of the Internal Organs and Skin of the Domestic Animals. Only a few changes have been made in the text of those chapters dealing with the clinical examination of the animal itself, but those concerned with special types of examination have been adapted to the needs of British students. A number of the original chapters have been rewritten.

A feature of this book, which reveals its only fault, is that an attempt has been made to cram a vast amount of information into only 220 pages of print while at the same time finding space for 213 illustrations, mainly photographs. The intention is to provide the student with an introduction to systematic clinical examination and as such it succeeds admirably, with certain minor reservations. The first is that the student must be made aware that the book is only an introduction, that in the space available only the framework of the subject can be presented and that the material provided does not represent all the knowledge required. It is intended to act as a guide and incentive to further practice and reading.

In the portions written by the translator herself the information is more complete; in other sections it is over-compressed and often scanty.

The illustrations are generally excellent but a few of the captions might be improved upon. For instance, Fig. 42, entitled "Subcutaneous oedema of the lower abdominal wall. Anthrax in a Horse," may have been a perfectly correct diagnosis in this particular case, but if regarded by the student as a typical indication of the disease will soon lead to difficulties. Similarly, Fig. 29, a remarkable photograph of swine erysipelas, may easily persuade the inexperienced student to disregard the fewer and less obvious lesions commonly encountered in practice. In the same way, the illustration and text of "Skin Tuberculosis," on page 28, should make it clear to the younger student that the acid-fast organisms referred to as being present in the lesions are not tubercle bacilli.

A book of this kind is so useful that it is to be hoped that as soon as a new edition is called for, the number of pages will be considerably increased and the scope of the contents correspondingly extended. The economics of publishing and present-day printing costs make it extremely difficult for an author to do proper justice to so comprehensive a subject. In spite of these handicaps, the present work is a very useful and practical addition to the library of every veterinary student and should be available and freely consulted during the latter years of his or her education.

The book is well-produced in very legible type upon excellent paper in the efficient and attractive manner characteristic of its publishers. The text of the book is clear and concise, and is remarkable for its studied economy in words.

Food Technology Processing and Laboratory Control. Advisory Editor, F. Aylward, PH.D., B.SC., F.R.I.C. Published by George Newnes Ltd., London. 303 pp. Price 21s.

With technological training so much in the air the appearance of this book is both useful and valuable. It is divided into two sections: the first deals with with processing methods as applied to many foods. There are individual chapters on sugar refining, sugar confectionery, chocolate manufacture, jam manufacture, edible fats/shortening, margarine, flour milling, bread making, biscuit manufacture and cake making, canning—fruits and vegetables, refrigeration and dehydration. Each of these sections is contributed by an expert in the field but the information is not given in very great detail. Each chapter, in other words, acts as a very good introduction to the subject with which it deals. This makes the provision of a list of references for further study a valuable addition but, unfortunately, such references are only given at the end of four out of 12 chapters. Nevertheless, the section does supply a valuable introduction to food technological processes and should be invaluable to any student thinking of specialising in one or other of the lines mentioned.

The second section of the book deals with the laboratory control of foodstuffs. This section includes chapters on sugar refining, jams, edible fats, wheat testing, flour testing, bakery materials, milk and meat products. Again, each chapter gives a very useful introduction to the subject which can be followed up by further reading when references are given which again, unfortunately, are not at the end of each chapter.

Whilst much of the book is of no direct value to members of the veterinary profession, nevertheless it should prove to be a very useful review of the technological processes utilised in food production to-day—a subject of which most veterinarians should have some knowledge. From the veterinarian's point of view omission of all but very scant reference in one or two places to the cause of food spoilage or to the effect of the processes used upon the bacterial and other microbial content of the foodstuffs treated is a drawback.

In conclusion it should be stated that the book is good so far as it goes and admitted that the author has got in as much information as the space allocated to the book would permit.

The Victoria Veterinary Benevolent Fund

A meeting of the Council of the Victoria Veterinary Benevolent Fund was held at 10, Red Lion Square, London, W.C.1, on October 17th, 1956, when the following members were present:—

Mr. H. W. Dawes (President) in the Chair, Mr. E. P. Barrett, Professor T. J. Bosworth, Major J. J. Dunlop, Mrs. D. I. Glover, Mr. G. N. Gould, Professors R. Lovell and J. McCunn, Mrs. B. Pugh, Professor L. P. Pugh, Messrs. J. N. Ritchie, Arnold Spicer, and H. Sumner, Miss O. Uvarov, Captain Wm. Watt, and Major W. H. Wortley.

In attendance were Mr. R. V. Thatcher, solicitor, and Mr. C. W. Francis, secretary.

Welcome to New Member

Before proceeding with the business on the agenda the President, on behalf of the members, extended a cordial welcome to Mrs. Pugh, the newly elected President of the Ladies' Guild, and expressed the hope that she would be able to take part in the deliberations of Council.

Minutes

The Minutes of the previous meeting, held on June 28th, 1956, having been printed in THE VETERINARY RECORD, were taken as read and signed as correct.

Apologies for Absence

The Secretary reported apologies for absence from the following: Messrs. G. Atkinson, E. Clark, John A. Flynn, R. E. Glover, L. E. Hughes, Dr. R. F. Montgomerie, Professor C. W. Ottaway, Miss V. Tillemont-Thomason, Mr. J. F. D. Tutt, Captain A. Whicher, Professors W. L. Weipers and G. H. Wooldridge, and Dr. W. R. Wooldridge.

Correspondence

(a) A letter was read from Mrs. D. I. Glover, Hon. Treasurer, conveying the splendid news that the Ladies' Guild had this year voted £925 for current relief, and £600 to the Special Gift a/c. The Members were deeply touched by these munificent donations, and *it was unanimously resolved*

That this Council records with the greatest pleasure its sincere thanks for the wonderful efforts of the Ladies' Guild over the past year and for the handsome sum of £1,525 donated to the Fund by the members at their recent Annual General Meeting, which will be distributed in accordance with their expressed wishes.

(b) The secretary reported the receipt of a letter dated September 10th, 1956, from the North of England Division of the B.V.A., stating that Mr. G. F. Brown, M.R.C.V.S., Hon. Secretary, had been nominated as their representative to serve on the Council in the place of the late Captain J. W. Rider.

(c) *Bequests:* The Secretary reported:—

(*i*) That under the terms of the will of the late Major J. H. Taylor, the Fund had received a legacy of £100.

(*ii*) That the sum of £100 had been bequeathed to the Fund by the late Mr. Reginald William Hall.

Accountant's Report

The following report was read and approved, a warm vote of thanks being accorded to the respective donors:—

Since the previous meeting of Council, the following special subscription, legacy, and donations have been received:—

	£ s. d.	£ s. d.
Special Subscription		
V.V.B.F. Ladies' Guild		925 0 0
Legacy		
Major J. H. Taylor (Darlington) ..		100 0 0
Donations		
R. Massey	2 2 0	
A. E. Payne	5 5 0	
G. W. Serth	6 0	
A. H. Tench	11 0	
Lincs and District Division B.V.A.	5 0 0	
North of England Division B.V.A.	10 0 0	
West of Scotland Division B.V.A.	5 0 0	
Banff, Moray, and Nairn Kennel Association	2 2 0	
British Timken Show	1 1 0	
Elstead Horse Show	1 1 0	
Windsor Championship Show ...	10 10 0	
		42 18 0
Collecting Boxes		
R. L. Beckett	2 10 0	
Herts and Beds Veterinary Society	13 5 6	
West of Scotland Division B.V.A.	3 13 7	
		19 9 1
		£1,087 7 1

Cases

No. 301. M.R.C.V.S. Aged 58. Seriously ill. Three children, aged 24, 21, and 18.

The secretary submitted correspondence received in this case since the last meeting, including a letter from a member of Council who unfortunately was unable to be present. After discussion, it was agreed that the correspondence be sent to the local member and that he be informed that the Council would welcome a report from him, particularly in regard to the grant being made for the benefit of the youngest daughter.

No. 312. M.R.C.V.S. Aged 67. As instructed at the previous meeting, the secretary had caused certain enquiries to be made in this case and submitted reports which were considered. *It was resolved*

(a) That the President be asked to make further enquiries in this case.

(b) That it be left to the Executive Committee as to the further action to be taken regarding this application.

No. 315. M.R.C.V.S. Aged 86. Crippled with arthritis. A report of the Executive Committee was received and approved. *It was resolved*

That a special gift of £10 be made in this case and that the Secretary be requested to write to the local veterinary surgeon, asking if he would kindly visit this recipient occasionally on behalf of the Council and submit a report for the next meeting.

(*Continued on page* 1041)

News and Comment

FULBRIGHT TRAVEL GRANTS, 1957-8

The United States Educational Commission in the United Kingdom announces that, under the provisions of the Fulbright Programme, travel grants are available to citizens of the United Kingdom and Colonies to go to America for an academic or educational purpose, such as study, research, or lecturing. All awards are competitive.

The basic criteria for the award of a travel grant are as follows:—

Applicants must hold a good University degree or recognised professional qualification prior to actual departure. Applicants must possess a guarantee of adequate financial support in dollars for the proposed period of the visit to America. All applicants must be citizens of the United Kingdom or Colonies, and are expected to return to reside permanently in their home countries. Four years must elapse from the date of return from America before a second application may be made for a Fulbright travel grant.

Graduate students must show proof of admission to an American institution of higher learning for a minimum period of nine months. In the case of medical internships, the hospital to which the applicant hopes to go must be acceptable to his registration body in the United Kingdom. Candidates must be free of National Service obligations. Grants to graduate students are valid for a period up to three years, but they are subject to annual renewal during this period.

Professors, lecturers, and senior research workers must intend to spend at least three months in the United States (exclusive of trans-Atlantic travel time), of which about two-thirds should be spent at one university or recognised research institution. Proof of affiliation is necessary. Grants cannot be given for attendance at conferences alone. Due to the increasing pressure on the travel grants, the Commission will be obliged to take into account the margin for travel available in the dollar award. Grants may be extended up to a period of two years, subject to satisfactory appointments and continued dollar support.

There are two closing dates in this competition dependent on the departure date. They are:—

March 15th, 1957, for those travelling between June 1st and July 31st, 1957, and

June 1st, 1957, for those travelling after August 1st, 1957.

The Victoria Veterinary Benevolent Fund—*Concluded.*

No. 316. Widow. Aged 49. Husband died on July 13th, 1956; daughter, aged 18.

An application for assistance having been considered, *it was resolved*

That a local member of the profession be asked to make a personal visit to this applicant, and that his report, if necessary, be dealt with by the Executive Committee.

No. 314. Member. Aged 84. In very poor health and crippled with arthritis. Having received a further report on this recipient's general health, etc., *it was resolved*

That a special gift of £15 be voted in this case.

Wortley Axe Fund

Before proceeding to discuss this item on the Agenda, the Chairman drew attention to the contents of a memorandum prepared for the information of members of Council and circulated with the Agenda and which, *inter alia*, included the terms of the will, dated July 2nd, 1909, the amount now invested by the Fund, and the following Minute of Council of the July 2nd, 1951:—

Wortley Axe Fund. The Executive Committee, having reported its considered views on the remit from the April meeting of Council as to the desirability or otherwise of establishing a Cottages Home Account, *it was resolved*

That an appeal for donations be launched at an appropriate date to give effect to the Wortley Axe Bequest for establishing Cottages to be called "The Wortley Axe Homes."

The Council then deliberated at length whether or not an application should be made to the High Court (Chancery Division) for a variation of the terms of the Wortley Axe Bequest, and after hearing the solicitor's views on the matter, *it was resolved*

(a) That having considered the Wortley Axe Bequest, the Council authorises Mr. R. V. Thatcher, the Fund's solicitor, to take the necessary legal steps to determine the possibility of having the terms of the will varied, in order to make it possible to assist those whom the will intended to benefit.

(b) That a special sub-committee of Council be appointed with power to act, and to consist of the President, Honorary Treasurer, Honorary Secretary, Mr. G. N. Gould, Mr. J. N. Ritchie, and Mr. Arnold Spicer.

(c) That the Minute of Council passed at a meeting held on July 2nd, 1951, be rescinded.

Staff Salaries

The President raised the question of the remuneration of the Secretary and the accountant, and after discussion *it was unanimously resolved*

That the salaries of these officers should be increased. It was further decided that the matter be settled at the next quarterly meeting, the President undertaking in the meantime to obtain certain information.

Date of Next Meeting

It was agreed that it be left in the hands of the Executive Committee to arrange the date of the next meeting, which if possible should be held on Friday, January 11th, 1957.

The meeting terminated with a cordial vote of thanks to the President for his conduct in the Chair.

Those wishing to apply are first asked to fill up a record card. *This in itself does not constitute an application.* Full-length application forms are sent only when candidates indicate that their plans are complete—giving nature of appointment and dollars available—which must be before the appropriate closing date. Full-length applications should be submitted *via* the Head of the candidate's College or University or employing body.

Applications should be made to: United States Educational Commission in the United Kingdom, 71, South Audley Street, London, W.1.

CORRECTION

We are advised by the Royal College of Veterinary Surgeons that with regard to the note under "Veterinary Education in the Republic of Ireland" the words "on and after the first day of 1957" should read "on and after June 1st, 1959."

UNIVERSITY NEWS

Edinburgh

The following Members of the Royal College of Veterinary Surgeons had degrees conferred upon them at a Graduation Ceremonial on December 14th:—

Degree of M.Sc. in Veterinary Science

Ewan Allan McPherson, M.R.C.V.S. Mr. McPherson is a Senior Lecturer in the Department of Veterinary Medicine of the School, and is the first person to be awarded the degree of M.Sc. in Veterinary Science by the University.

Degree of B.Sc. in Veterinary Science

John Atkinson Beech, M.R.C.V.S.; Doris Dawson Brown, M.R.C.V.S.; Andrew Sharp Kettles, M.R.C.V.S.; George McGregor McDougall, M.R.C.V.S., and Philip James Smith, M.R.C.V.S.

These five graduates all obtained their M.R.C.V.S. Diploma at the examinations held in Edinburgh during the same week.

Glasgow

In the December examinations Mr. George Randell passed his final professional.

PROPOSED BILL ON JEWISH SLAUGHTER

The House of Commons refused leave last week by 178 votes to 132 for the introduction of a private Member's Bill which would have affected the Jewish method of killing animals for food.

Mr. Crouch, emphasising that he was not anti-semitic, said that his Slaughter of Animals (Amendment) Bill was to ensure that animals were stunned before slaughter. Existing legislation provided that no animal could be slaughtered unless electrically stunned or shot by captive-bolt. Jews and Moslems were excepted from complying with this legislation.

Mr. Crouch went on to describe slaughterhouse scenes. Mr. Martin Lindsay intervened to say that he had been to an abattoir that morning. "I have seen animals killed by the Jewish method and am convinced there is no cruelty."

Sir Henry D'Avigdor-Goldsmid, opposing the Bill, described the Jewish method as one of the most humane in the world and quoted a number of authorities. Cruelty, if it occurred, could be dealt with under the Slaughter of Animals (Prevention of Cruelty) Regulations, 1954, he suggested.

BACK TO HORSES

Liverpool Corporation Highways Committee has recommended its Council to purchase eight horses to replace mechanical vehicles on street works. At one time the department had 40 horses on this work, but mechanisation resulted in the disappearance of all but six.

Liverpool Housing Committee has authorised its city architect in consultation with its city engineer to offer a suitable site at Kirkby to a veterinary surgeon so as to enable him to erect a surgery.

PERSONAL

Birth

APPLEBY.—On November 10th, 1956, to Josephine, wife of E. C. Appleby, PH.D., B.SC., M.R.C.V.S., of 4, Gillespie Street, Edinburgh, a third son, John Christopher.

Marriage

BROWN—SMITH.—On Saturday, December 15th, 1956, at the Church of St. Mary-at-Finchley, James Affleck Brown, M.R.C.V.S., youngest son of Mr. James A. Brown and the late Mrs. Brown of Conniston Towers, Biggar, to Rosa Marjorie Smith (formerly Assistant to the General Secretary, B.V.A.) younger daughter of the late Mr. J. A. Findlay Smith and Mrs. Smith of 7, Seymour Road, Finchley, London, N.3.

R.C.V.S. OBITUARY

BATT, E. A., Westfield, Lower Shiplake, Oxon. Graduated London, December 12th, 1898. Died December 7th, 1956.

VARLEY, Edward, Divisional Veterinary Officer, Ministry of Agriculture, 74, Lairgate, Beverley, Yorks. Graduated London, July 13th, 1922. Died November 28th, 1956, aged 63 years.

COMING EVENTS

January

3rd (Thurs.). Meeting of the Supplementary Veterinary Register Division at 7, Mansfield Street, London, W.1, 2 p.m.

General Meeting of the Central Veterinary Society at the Royal Veterinary College, Camden Town, N.W.1, 6 p.m.

7th (Mon.). 18th Ordinary General Meeting of the A.V.T. & R.W's. at the Animal Diseases Research Association, Moredun Institute, Gilmerton, Edinburgh, 9, 10 a.m.

24th (Thurs.). Annual Dinner and Dance of the V.V.B.F. (Northern Division) in the Northern Hotel, Aberdeen, 7.30 p.m.

BRITISH VETERINARY ASSOCIATION QUARTERLY MEETINGS

Wednesday, January 23rd, 1957, at 7, Mansfield Street, W.1.

10.00 a.m. Parliamentary and Public Relations Committee.
11.30 a.m. Veterinary State Medicine Committee.
2.00 p.m. Small-Animals Committee.

Thursday, January 24th, 1957, at 7, Mansfield Street, W.1.

10.00 a.m. Farm Live-stock Committee.
11.30 a.m. Home Appointments Committee.
12.30 p.m. Finance Sub-committee.
2.30 p.m. General Purposes and Finance Committee.

Friday, January 25th, 1957, Connaught Rooms, Great Queen Street, W.C.2.

10.30 a.m. Extraordinary General Meeting followed by Council Meeting.

FOOT-AND-MOUTH DISEASE

The area described in the schedule below shall cease to be an Infected Area for the purpose of preventing the spread of foot-and-mouth disease on December 27th, 1956:—

IN THE COUNTY OF KENT

The Boroughs of Dover and Deal.

In the Petty Sessional Division of Wingham and Sandwich: The parishes of Northbourne, Tilmanstone, Eythorne, Coldred, Sutton, Ripple, Ringwould, West Langdon, East Langdon, St. Margaret's at Cliffe, Guston, River, Whitfield, Temple Ewell, Lydden, Alkham and Hougham Without.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Bedford. Broughton End Farm, Lidlington (Dec. 12).

Hants. Coomb Cross Farm, East Meon, Petersfield (Dec. 13).

Lanarks. Canderside Farm, Stonehouse (Dec. 13).

Perth. Arnieve, Gargunnock (Dec. 12).

Warwicks. Cloudesley Bush Farm, Monks Kirby, Rugby (Dec. 12).

Yorks. Goat Hill Farm, Slaithwaite, Huddersfield (Dec. 13).

Fowl Pest

Essex. 68, Langham Road, Boxted, Colchester (Dec. 12).

Lancs. White Holme Farm, Bispham Road, Carleton; Mill Road, Lewth, Woodplumpton; Guild Farm, Grange Lane, Hutton; Avonhurst, Garstang Road, Myerscough (Dec. 10); Hillthorpe, Knoll Lane, Little Hoole; Oakdene, Grange Lane, Hutton; Grange Farm, Smallwoodhey, Pilling; Mally Farm, Eaves, Woodplumpton; Holmwood Farm, Goosnargh; Silver Ash, Stalmine, Fleetwood (Dec. 11); Old Print Works, Catterall, Preston; Buckholes Farm, High Wheelton, Chorley; Ivydene, Eaves, Woodplumpton; Smalleyfold Farm, Baldestone, Blackburn; Luck Leach Cottage Farm, Catforth; Rangeover, Skip Lane, Hutton; Wrainhow House, Lewth Lane, Woodplumpton (Dec. 12); 61, Moor Road, Croston; Ashlyn Nurseries, Whittle Hill, Woodplumpton; Woodside Poultry Farm, Out Rawcliffe; Beechcroft, Town Lane, Hoole (Dec. 13).

Yorks. Village Farm, Askham Richard (Dec. 11).

Swine Fever

Ches. Ashbrook Farm, Pennys Lane, Rudheath, Northwich (Dec. 12).

Essex. Delaware, Rothschild Avenue, Rayleigh (Dec. 11).

Monmouth. 1, Lower Argoed Cottages, Aberbeeg, Abertillery (Dec. 11).

Staffs. Roddige Farm, Fradley, Lichfield (Dec. 12).

Wilts. Browns Farm, Marlborough (Dec. 11).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

Anaesthesia and its Application in Small-animal Practice

Sir,—The letter from Mr. R. A. Brown *re* anaesthesia in the Greyhound suggests that recent physical exertion might increase the duration of anaesthesia. Mr. G. L. B. Henderson suggests shock as the factor responsible.

In my opinion the case quoted is the normal behaviour of the Greyhound with pentobarbitone sodium. I have found that the dose of sodium thiopentone to produce full anaesthesia in the Greyhound is abnormally high—1 to 1.2 grammes for a 65 lb. dog—and the duration is as long as with pentobarbitone sodium in the other breeds. Using pentobarbitone sodium* for destruction I have found that a Greyhound will continue respirations after a dose—intravenous—of 1 g. per lb.

Yours faithfully,
J. ALLCOCK.

36, Whatley Road,
Clifton,
Bristol, 8.

December 10th, 1956.

* Euthatal.

Unilateral Cryptorchidism in the Pig

Sir,—In Vol. 66, page 482 of your journal, there appears the following statement:—

"If the boar is a unilateral cryptorchid and the scrotal testis is removed, the boars become as barrows with a total loss of sex instinct and apparently only a very small percentage of crypt-

orchid pigs from which the normal testis has been removed develop a sexual odour in the carcase particularly if the pigs are marketed at around six months of age."

As most pigs marketed at that age are destined for bacon and ham production I would point out that under the Fat Stock Marketing Corporation all cryptorchids, unilateral or bilateral, are down-graded, and are *not* eligible for the guarantee payment. They are treated in the factories as "manufacturing meat," and are not cured into bacon. There is nothing new in this, as it was the practice in factories long before Pig Marketing schemes were thought of.

I am told that the Technical Development Committee is responsible for the statement quoted above, and it has been suggested to me that, in view of the possible damage such an unchallenged statement may have upon the necessity for cryptorchid surgery, a statement as to the true position from the factory angle would be advisable. The quoted paragraph illustrates once more the wide gap existing in knowledge of the pig alive on the farm, and the bacon slice on the breakfast plate!

Yours faithfully,

D. J. ANTHONY.

Marsh & Baxter Ltd.,
Brierley Hill,
Staffs.

November 27th, 1956.

Bovine Hepatic Disease

Sir,—After reading a brief article on "Bovine Hepatic Disease" in THE VETERINARY RECORD of November 24th, I thought it worth recording the deaths of two heifers due to *Fusiformis necrophorus* infection.

Both cases were identical, and occurred on the same farm, at an interval of two years. The chief symptom was that the animals coughed up large quantities of blood.

Post-mortem examination in both cases was carried out by the staff of Bristol University Veterinary Department, and revealed abscesses in lungs and liver, due to *F. necrophorus*.

The pathologist's report concludes: "There appears little doubt that the primary lesions were in the liver, with secondaries in the hepatic vein and then embolic to the lungs. The liver lesions may well have resulted from primary gut infection. The cause of haemorrhage on a small scale was rupture of small blood vessels into the lumen of adjoining bronchii, *via* ruptured necrotic lesions in the wall. The terminal extensive haemorrhage was due to a similar change on a larger scale.

"There was no evidence of foul-in-the-foot."

The farm on which these cases occurred carries a large number of cattle, and suffers a great deal from this latter condition.

Yours faithfully,

MICHAEL SEARLE.

Chapelgarth,
Old Sodbury,
Bristol.

November 26th, 1956.

Content of "The Veterinary Record"

Sir,—I cannot let Miss Joan Joshua's insinuation, that my original letter concerning the above was prompted because I was "sub-standard," go unchallenged.

My claim, allowing me to belong to the ranks of "rejectees" (and there seem to be quite a number of us), comes from one article that was refused some four years ago, and I can assure you that my attitude at the time was disagreement with the scrutineer but willingness to accept his better judgement, I hope you will believe that I could not bear a grudge for that length of time.

The only reason for mentioning my rejected article was to stop someone from observing that I was complaining at the contents but not supplying any clinical material. Instead, I am accused of ill-feeling. I am afraid I am between two fires.

Yours faithfully,

SIDNEY S. NYE.

The Surgery,
230, South Street,
Romford,
Essex.

December 15th, 1956.

[It is proposed to answer correspondence under this heading after the season of goodwill has expired! —*Editor*.]

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period		Anthrax	Atrophic Rhinitis	Foot-and-Mouth	Fowl Pest	Sheep Scab	Swine Fever
16th to 30th November, 1956		21	—	11	98	—	33
Corresponding period in	1955	34	—	1	110	—	57
	1954	23	—	—	58	—	42
	1953	24	—	1	37	—	69
1st January to 30th November, 1956		1,218	11	146	771	—	700
Corresponding period in	1955	721	6	7	624	—	1,331
	1954	303	4	12	717	—	1,336
	1953	569	—	35	862	—	2,578